

# The Quest for Noiseless Computers

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**Why?**

noiseless computers

power outage!

sometime, a while back all power was cut at The Knoll – and it was a different building!

no noise whatsoever!

# noiseless computers

the easy answer:

**TURN IT OFF!**



# noiseless computers

the **TURN IT OFF!** solution:

- no noise
- no kernel crashes
- no operating system problems
- no application problems
- no documentation problems
- and the list goes on, in a word ... *bliss* ...

# noiseless computers

the real reason:

The Knoll remodeling

# noiseless computers





# noiseless computers



a beautiful small  
concert hall

# noiseless computers





# noiseless computers

- move it somewhere else:
  - closets
  - rooms
  - but: no space for that in The Knoll
- hide it:
  - isolation boxes
    - not very effective (they have fans!)
    - expensive

# noiseless computers

- Sources: FANS...
  - case fans
  - power supply fan
  - cpu cooler fan
  - chipset coolers
  - video card fans
  - other misc fans

# noiseless computers

- Sources: STORAGE...
  - hard disks
  - optical storage



# noiseless computers

- solutions:
  - case fans: big and slow is good
    - select a good case!
  - power supply fans: same, or no fans
    - you get what you pay for...
  - cpu cooler fans: same
    - and choose the right cpu...
  - chipset fans: do without them (passive)
  - video card fans: do without them (passive)

# noiseless computers

- water cooling:
  - a closed loop with:
    - reservoir
    - pump
    - heat transfer blocks (cpu, chipset, video card)
    - a radiator
    - and guess what: fans! (again!)

**we still have moving parts...**

# noiseless computers

- water cooling:
  - a closed loop with:
    - reservoir
    - pump
    - heat transfer blocks (cpu, chipset, video card)
    - a radiator
    - and guess what: fans! (again!)

**we still have moving parts... and fans...**

# noiseless computers

- fanless water cooling:
  - a passive cooling tower
  - a very low noise pump

# noiseless computers

- fanless water cooling:
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- add:
  - fanless power supply

# noiseless computers

- fanless water cooling:
  - a passive cooling tower
  - a very low noise pump
- add:
  - fanless power supply
  - a case with good air flow and damping

**and you are there!**

# noiseless computers

- reserator



# noiseless computers

- passive cooling:
  - cases designed to have no fans
    - big heat sinks with fins
    - heat pipe technology to transfer heat
- available:
  - mCubed HFX
- we used:
  - zalman tnn500 / tnn300



# noiseless computers



- mCubed HFX

# noiseless computers



- TNN500
  - 100W
  - ATX

# noiseless computers



- TNN300
  - 70W
  - mATX

# noiseless computers

- passive cooling:
  - tnn500 / tnn300
  - bad news:
    - very expensive

# noiseless computers

- passive cooling:
  - tnn500 / tnn300
  - bad news:
    - very expensive
  - worse news:
    - no longer manufactured



# noiseless computers



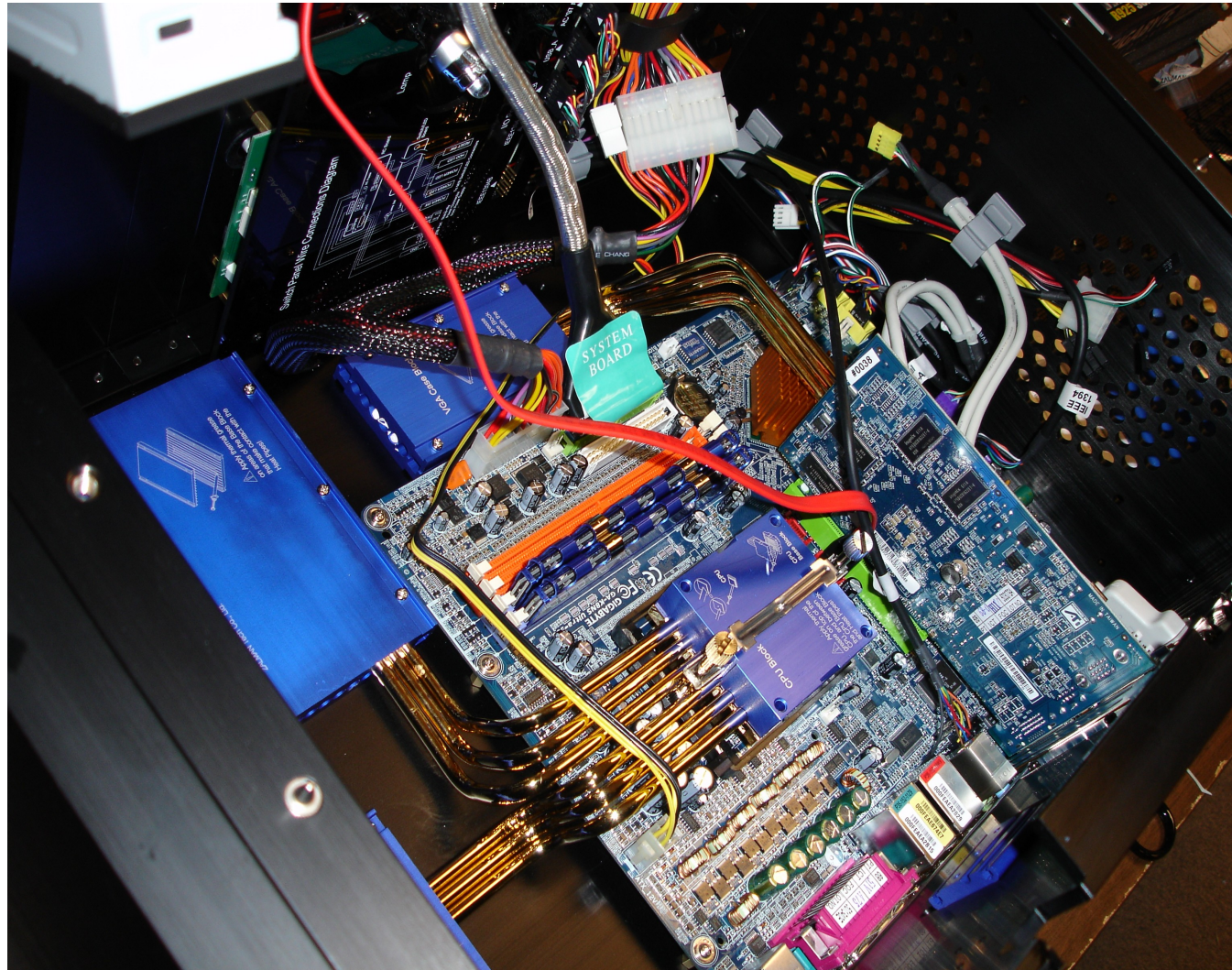


# noiseless computers





# noiseless computers





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some measurements...



# noiseless computers

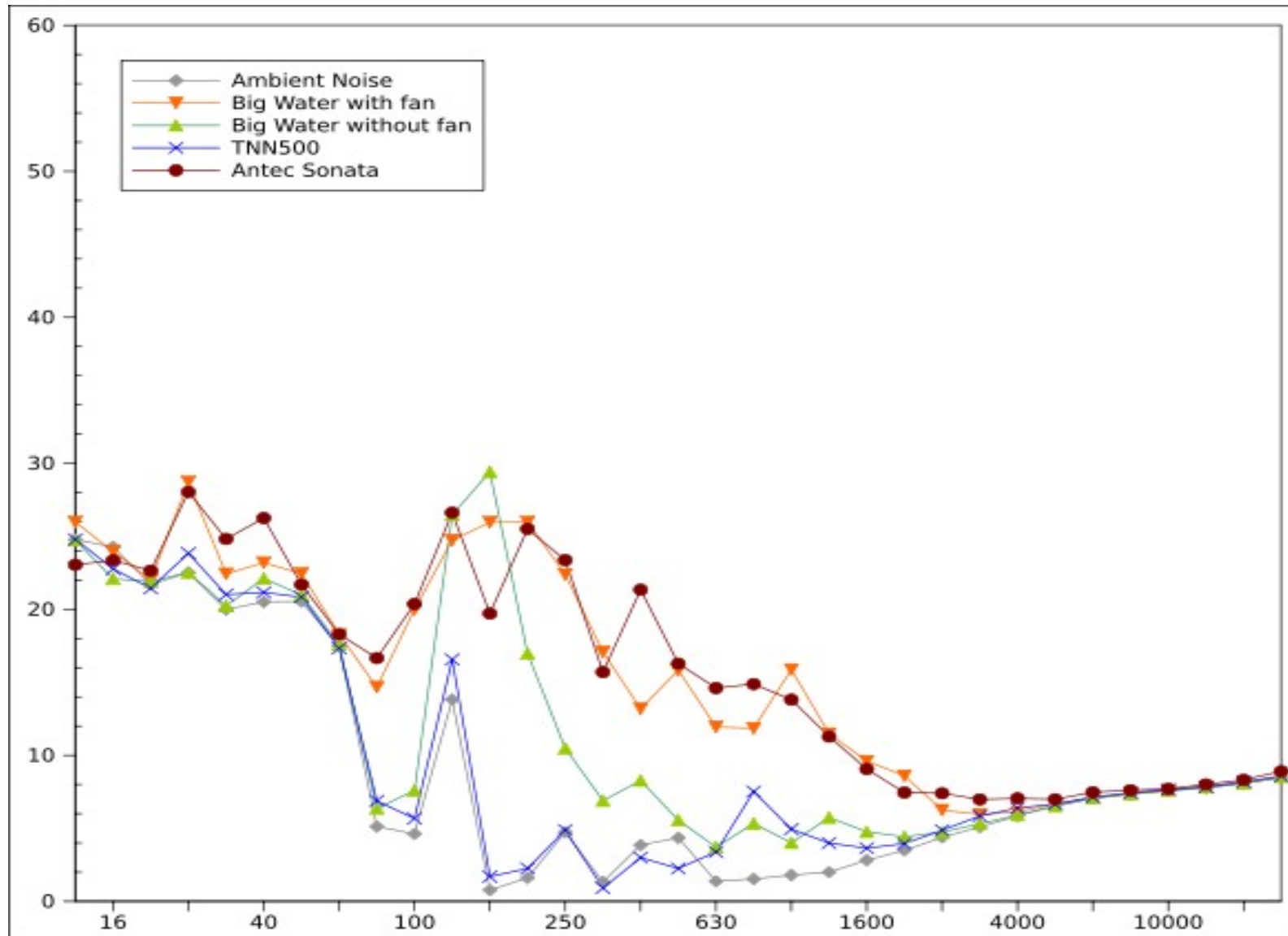




# noiseless computers

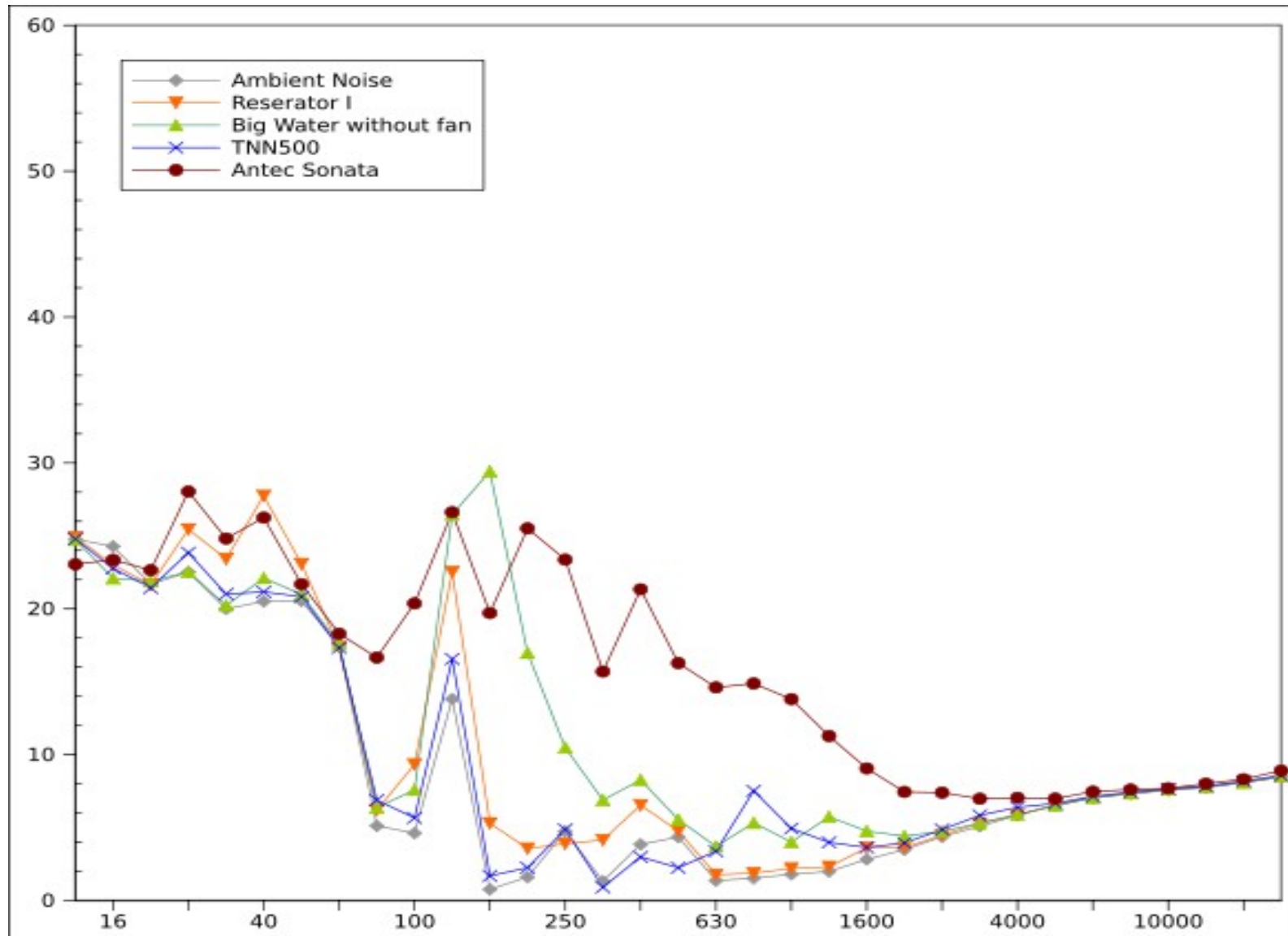


# noiseless computers





# noiseless computers



# noiseless computers

- storage:
  - hard disks (currently samsung f1 is good)
    - 2.5" - but slower
  - solid state disks, expensive
  - netbooting, tricky
- dvd writers, oh well, noisy...

# noiseless computers

- laptops:
  - coolers, not much difference...
- macs:
  - silent – when they are doing nothing...
- video projectors
  - no solution...



# noiseless computers

thanks...

questions?  
answers?